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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/593,960	09/22/2006	Yasushi Araki	Q97019	4025

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EXAMINER	
GUPTA, RAJ R	
ART UNIT	PAPER NUMBER
4126	
MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/593,960	ARAKI, YASUSHI	
	Examiner	Art Unit	
	RAJ GUPTA	4126	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 September 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 September 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *9/22/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. Applicant is reminded of the proper content of an abstract of the disclosure.

2. A patent abstract is a concise statement of the technical disclosure of the patent and should include that which is new in the art to which the invention pertains. If the patent is of a basic nature, the entire technical disclosure may be new in the art, and the abstract should be directed to the entire disclosure. If the patent is in the nature of an improvement in an old apparatus, process, product, or composition, the abstract should include the technical disclosure of the improvement. In certain patents, particularly those for compounds and compositions, wherein the process for making and/or the use thereof are not obvious, the abstract should set forth a process for making and/or use thereof. If the new technical disclosure involves modifications or alternatives, the abstract should mention by way of example the preferred modification or alternative.

3. The abstract should not refer to purported merits or speculative applications of the invention and should not compare the invention with the prior art.

4. Where applicable, the abstract should include the following:

(1) if a machine or apparatus, its organization and operation;

(2) if an article, its method of making;

(3) if a chemical compound, its identity and use;

(4) if a mixture, its ingredients;

(5) if a process, the steps.

5. Extensive mechanical and design details of apparatus should not be given.

6. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. **Claims 1, 12, 13, 15, and 17** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Petritsch et al (US 6340789)** in view of **Tanaka et al (US 5324610)**.

10. With regard to **claim 1**, Petritsch et al (US 6340789, hereinafter Petritsch) teaches in Fig 5: A photodetector (Fig 5 item 20) comprising: at least one electron transporting organic material (Fig 5 item 14; "MCP" col 6 ln 31); and at least one hole transporting material (Fig 5 item 6).

11. With regard to **claim 12**, Petritsch teaches in Fig 5: at least one transparent electrode (Fig 5 item 4, "are transparent" col 5 ln 32); and at least one electrode (Fig 5 item 12), wherein said at least one electron transporting organic material (Fig 5 item 14) is interposed between said at least one transparent electrode and said at least one electrode (it is clear from Fig 5 that item 14 is disposed between items 4 and 12).

12. With regard to **claim 13**, Petritsch teaches in Fig 5: at least one transparent electrode (Fig 5 item 4, "are transparent" col 5 ln 32); and at least one electrode (Fig 5 item 12), wherein said at least one electron transporting organic material (Fig 5 item 14) and said at least one hole transporting material (Fig 5 item 6) are interposed between said at least one transparent electrode and said at least one electrode (it is clear from Fig 5 that items 14 and 6 are disposed between items 4 and 12).

13. With regard to **claim 15**, no limitations of patentable weight are present in this claim beyond those of claim 1. This is a product by process claim and thus, "Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Please see MPEP 2113 for further discussion.

14. With regard to **claim 17**, Petritsch teaches: An imaging device comprising a photodetector. by stating, "there is provided a method of forming a … photoconductive device …" (col 2 ln 24-26).

15. With regard to **claims 1, 12, 13, 15, and 17**, Petritsch does not teach: said at least one electron transporting organic material has an ionization potential of more than 5.5 eV.

16. Tanaka et al (US 5324610, hereinafter Tanaka) teaches: said at least one electron transporting organic material has an ionization potential of more than 5.5 eV, by stating, "an electron transporting agent … having an ionized potential of 5.3 to 5.6 eV," (col 2, ln 46-48). Please see MPEP 2144.05 regarding the obviousness of ranges. Tanaka teaches this in order to obtain, "improved sensitivity and excellent durability," (col 2 ln 26-27).

17. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Tanaka along with those of Petritsch in order to achieve improved sensitivity and excellent durability.

18. **Claims 2, 3, 14, and 16** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Petritsch et al (US 6340789)** in view of **Nakaya et al (US 5792557)**.

19. With regard to **claim 2**, Petritsch teaches in Fig 5: A photodetector (Fig 5 item 20) comprising: at least one electron transporting organic material (Fig 5 item 14; "MCP" col 6 ln 31); and at least one hole transporting material (Fig 5 item 6).

20. With regard to **claim 3**, Petritsch teaches: said at least one hole transporting material is at least one hole transporting organic material (Fig 5 item 6 is "POPT" according to col 6 ln 4).

21. With regard to **claim 14**, Petritsch teaches in Fig 5: at least one transparent electrode (Fig 5 item 4, "are transparent" col 5 ln 32); and at least one electrode (Fig 5 item 12), wherein said at least one electron transporting organic material (Fig 5 item 14) and said at least one hole transporting organic material (Fig 5 item 6) are interposed between said at least one transparent

electrode and said at least one electrode (it is clear from Fig 5 that items 14 and 6 are disposed between items 4 and 12).

22. With regard to **claim 16**, no limitations of patentable weight are present in this claim beyond those of claim 3. This is a product by process claim and thus, "Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Please see MPEP 2113 for further discussion.

23. With regard to **claims 2, 3, 14, and 16**, Petritsch does not teach: an ionization potential of said at least one electron transporting organic material is larger than an energy necessary for the highest-level electron of said at least one hole transporting material to be taken out to a vacuum infinite far point or an ionization potential of said at least one electron transporting organic material is more than an ionization potential of said at least one hole transporting organic material.

24. Nakaya et al (US 5792557, hereinafter Nakaya) teaches: an ionization potential of said at least one electron transporting organic material is larger than an energy necessary for the highest-level electron of said at least one hole transporting material to be taken out to a vacuum infinite far point or an ionization potential of said at least one electron transporting organic material is more than an ionization potential of said at least one hole transporting organic material, by stating, "… the difference in ionization potential Ip between the layer having a hole injecting and

transporting function and the layer having a[n] … electron injecting and transporting function is at least 0.25 eV," (col 10 ln 47-52), in order to have a, "photo-electron function," (col 4 ln 41). Please note that it is well known in the art that the energy necessary for the highest-level electron of a given material to be taken out to a vacuum infinite far point is the very definition of an ionization potential.

25. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Nakaya along with those of Petritsch in order to have a device with a photo-electron function.

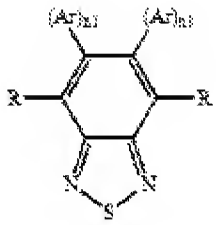
26. **Claims 1 and 4** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Petritsch et al (US 6340789)** in view of **Tanaka et al (US 5324610)** as applied to claim 1 above, and further in view of **Stossel et al (US 7223484)** as evidenced by **Asfandiarov et al (Investigation of Electron Structure of 2,1,3-Benzothiadiazole Derivatives by Means of Negative Ion Mass Spectrometry, Photoelectron Spectroscopy and Absorption Spectroscopy; Rapid Commun. Mass Spectrom. 12, 595–602, 1998)**.

27. Petritsch in view of Tanaka teaches all the limitations of claim 1 as discussed above.

28. Petritsch in view of Tanaka does not teach: the ionization potential of said at least one electron transporting organic material is more than 6.0 eV.

29. Stossel et al (US 7223484, hereinafter Stossel) teaches the use of 2,1,3-Benzothiadiazole derivatives as Formula (III):

Formula (III)



as, “An organic photodetector … transport material …” (col 30 ln 11-13), in since, " The 2,1,3-benzothiadiazole-containing compounds of the invention lead, when appropriate devices are used, to excellent operating lives …” (col 2 ln 57-59).

30. However Stossel does not explicitly disclose the fact that the ionization potential of 2,1,3-Benzothiadiazole derivatives is greater than 6 eV.

31. Asfandiarov et al (Investigation of Electron Structure of 2,1,3-Benzothiadiazole Derivatives by Means of Negative Ion Mass Spectrometry, Photoelectron Spectroscopy and Absorption Spectroscopy; Rapid Commun. Mass Spectrom. 12, 595–602, 1998, hereinafter Asfandiarov) provides evidence that the ionization energies of 2,1,3-benzothiadiazole derivatives are in excess of 6 eV, as they range from 7.77 - 8.44 eV (pg 597, Table 2).

32. Thus Stossel does teach: the ionization potential of said at least one electron transporting organic material is more than 6.0 eV, as discussed immediately above.

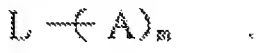
33. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Stossel as evidenced by Asfandiarov in concert with those of Petritsch in view of Tanaka in order to lead to appropriate devices with excellent operating lives.

34. **Claims 1 and 5-11** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Petritsch et al (US 6340789)** in view of **Tanaka et al (US 5324610)** as applied to claim 1 above, and further in view of **Kimura (US 2003/0072965)**.

35. Petritsch in view of Tanaka teaches all the limitations of claim 1 as discussed above.

36. Petritsch in view of Tanaka does not teach: said at least one electron transporting organic material is a compound represented by formula (I):

Formula (I)



wherein m represents an integer of 2 or more; L represents a linking group; and each of A's independently represents a hetero ring group where at least two aromatic hetero rings are condensed to each other, and A's are the same or different;

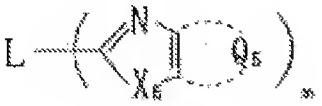
or said at least one electron transporting organic material is a compound represented by formula (III):

Formula (III)

wherein m represents an integer of 2 or more; L represents a linking group; each of X's independently represents O, S, Se, Te or N-R; R represents a hydrogen atom, an aliphatic hydrocarbon group, an aryl group or a hetero ring group; and each of Q3's independently represents an atomic group necessary for forming an aromatic hetero ring;

or said at least one electron transporting organic material is a compound represented by formula (V):

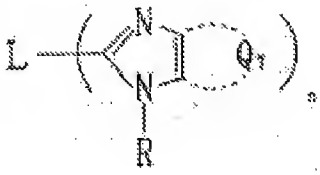
Formula (V)



wherein m represents an integer of 2 or more; L represents a linking group; each of Xs's independently represents O, S or N-R; R represents a hydrogen atom, an aliphatic hydrocarbon group, an aryl group or a hetero ring group; and each of Q5's independently represents an atomic group necessary for forming a 6- membered nitrogen-containing aromatic hetero ring;

or said at least one electron transporting organic material is a compound represented by formula (VII):

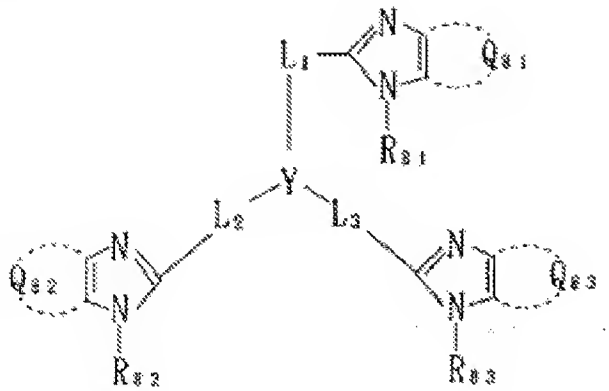
Formula (VII)



wherein n represents an integer of 2 to 8; L represents a linking group; each of R's independently represents a hydrogen atom, an aliphatic hydrocarbon group, an aryl group or a hetero ring group; and each of Qv's independently represents an atomic group necessary for forming a 6-membered nitrogen-containing aromatic hetero ring;

or said at least one electron transporting organic material is a compound represented by formula (VIII):

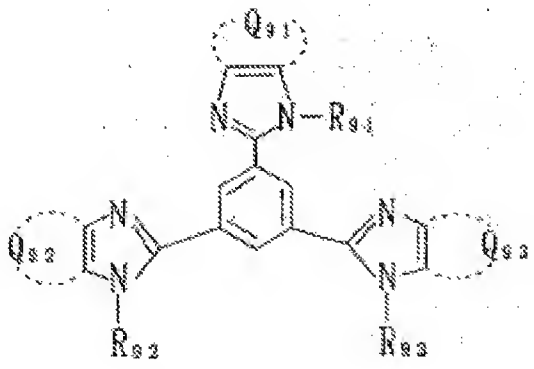
Formula (VIII)



wherein Q81, Q82 and Q83 each independently represents an atomic group necessary for forming a 6-membered nitrogen-containing aromatic hetero ring; R81, R82 and R83 each independently represents a hydrogen atom, an aliphatic hydrocarbon group, an aryl group or a hetero ring group; L1, L2 and L3 each independently represents a linking group; and Y represents a nitrogen atom or a 1,3,5-benzenetriyl group;

or said at least one electron transporting organic material is a compound represented by formula (IX):

Formula (IX)

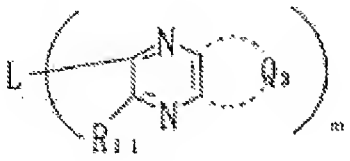


wherein Q91, Q92 and Q93 each independently represents an atomic group necessary for forming a 6-membered nitrogen-containing aromatic hetero ring; and R91, R92 and R93 each

independently represents a hydrogen atom, an aliphatic hydrocarbon group, an aryl group or a hetero ring group;

or said at least one electron transporting organic material is a compound represented by formula (XI):

Formula (XI)



wherein m represents an integer of 2 or more; L represents a linking group; each of Q3' s independently represents an atomic group necessary for forming an aromatic hetero ring group; and each of R11's independently represents a hydrogen atom or a substituent.

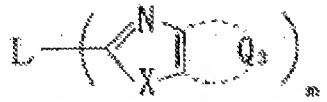
37. Kimura (US 2003/0072965, hereinafter Kimura) teaches: said at least one electron transporting organic material is a compound represented by formula (I):

Formula (I)

wherein m represents an integer of 2 or more; L represents a linking group; and each of A's independently represents a hetero ring group where at least two aromatic hetero rings are condensed to each other, and A's are the same or different;

and said at least one electron transporting organic material is a compound represented by formula

Formula (III)

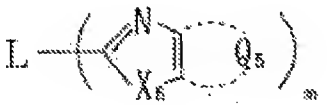


(III):

wherein m represents an integer of 2 or more; L represents a linking group; each of X's independently represents O, S, Se, Te or N-R; R represents a hydrogen atom, an aliphatic hydrocarbon group, an aryl group or a hetero ring group; and each of Q3's independently represents an atomic group necessary for forming an aromatic hetero ring;

and said at least one electron transporting organic material is a compound represented by formula (V):

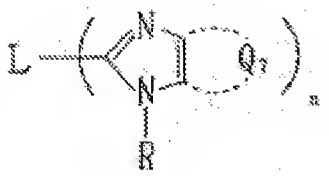
Formula (V)



wherein m represents an integer of 2 or more; L represents a linking group; each of Xs's independently represents O, S or N-R; R represents a hydrogen atom, an aliphatic hydrocarbon group, an aryl group or a hetero ring group; and each of Q5's independently represents an atomic group necessary for forming a 6- membered nitrogen-containing aromatic hetero ring;

and said at least one electron transporting organic material is a compound represented by formula (VII):

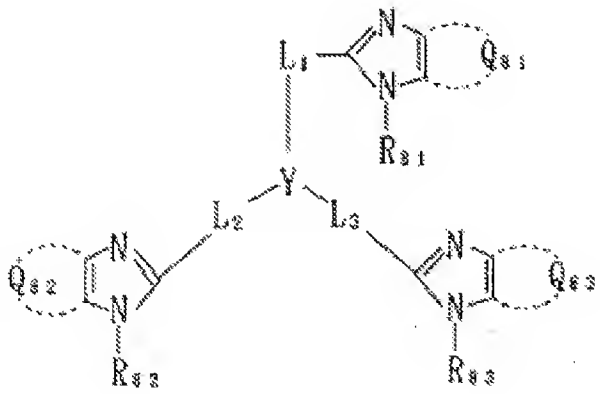
Formula (VII)



wherein n represents an integer of 2 to 8; L represents a linking group; each of R's independently represents a hydrogen atom, an aliphatic hydrocarbon group, an aryl group or a hetero ring group; and each of Qv's independently represents an atomic group necessary for forming a 6-membered nitrogen-containing aromatic hetero ring;

and said at least one electron transporting organic material is a compound represented by formula (VIII):

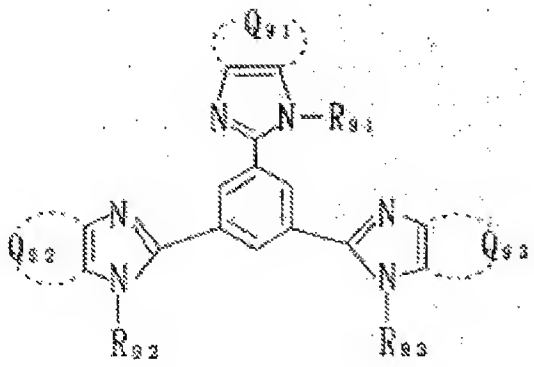
Formula (VIII)



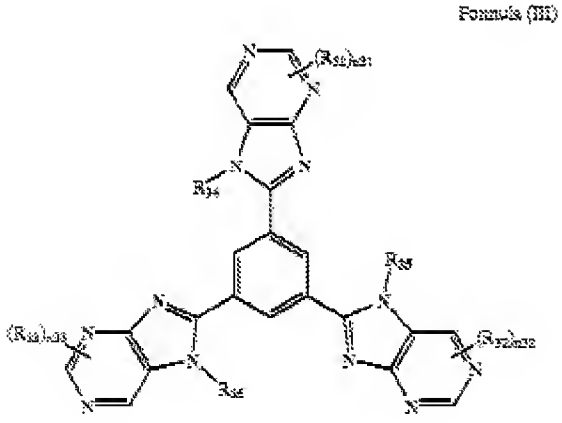
wherein Q81, Q82 and Q83 each independently represents an atomic group necessary for forming a 6-membered nitrogen-containing aromatic hetero ring; R81, R82 and R83 each independently represents a hydrogen atom, an aliphatic hydrocarbon group, an aryl group or a hetero ring group; L1, L2 and L3 each independently represents a linking group; and Y represents a nitrogen atom or a 1,3,5-benzenetriyl group;

and said at least one electron transporting organic material is a compound represented by formula (IX):

Formula (IX)



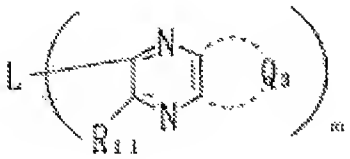
wherein Q91, Q92 and Q93 each independently represents an atomic group necessary for forming a 6-membered nitrogen-containing aromatic hetero ring; and R91, R92 and R93 each independently represents a hydrogen atom, an aliphatic hydrocarbon group, an aryl group or a hetero ring group, by teaching in Formula (III):



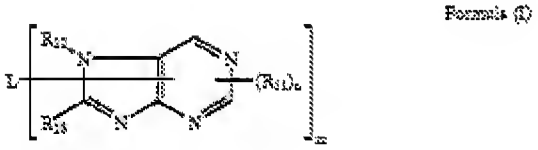
where, "R31, R32 and R33 represent a substituent, respectively; R34, R35 and R36 represent a hydrogen atom, an aliphatic hydrocarbon group, an aryl group or a heterocyclic group, respectively; and n31, n32 and n33 represent an integer of 0 to 2, respectively," ([0015]).

38. Kimura also teaches: said at least one electron transporting organic material is a compound represented by formula (XI):

Formula (XI)



wherein m represents an integer of 2 or more; L represents a linking group; each of Q3' s independently represents an atomic group necessary for forming an aromatic hetero ring group; and each of R11's independently represents a hydrogen atom or a substituent, by teaching Formula (I):



where, "R11 represents a substituent; R12 represents a hydrogen atom, an aliphatic hydrocarbon group, an aryl group or a heterocyclic group; R13 represents a hydrogen atom or a substituent; n represents an integer of 0 to 2; L represents a single bond or a linking group; and m represents an integer of 2 or more," ([0010]).

39. Kimura teaches all this in order to, "provide a … device excellent in … durability …" ([0007]).

40. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Kimura along with those of Petritsch and Tanaka in order to provide a device excellent in durability.

41. **Claims 1 and 17-20** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Petritsch et al (US 6340789)** in view of **Tanaka et al (US 5324610)** as applied to claims 1 and 17 above, and further in view of **Iwasaki (US 2003/0209651)**.

42. Petritsch in view of Tanaka teaches all the limitations of claims 1 and 17 as discussed above.

43. Petritsch also teaches in Fig 5: a substrate (Fig 5 item 10); and a first layer comprising a first photodetector (Fig 5 items 6, 28, and 14).

44. Petritsch in view of Tanaka does not teach: a second layer comprising a second photodetector; a third layer comprising a third photodetector; the first photodetector comprises a blue light photodetector; the second photodetector comprises a green light photodetector; and the third photodetector comprises a red light photodetector.

45. Iwasaki (US 2003/0209651, hereinafter Iwasaki) teaches: a second layer comprising a second photodetector (Fig 1 item 101); a third layer comprising a third photodetector (Fig1 item 103); the first photodetector (Fig 1 item 102) comprises a blue light photodetector (clearly visible in Fig 1 as the portion of the light labeled "B" is absorbed by this layer); the second photodetector comprises a green light photodetector (clearly visible in Fig 1 as the portion of the light labeled "G" is absorbed by this layer); and the third photodetector comprises a red light photodetector (clearly visible in Fig 1 as the portion of the light labeled "R" is absorbed by that layer), in order to not have to use a color filter system ([0005]-[0007]).

46. Therefor it would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Iwasaki along with those of Petritsch in view of Tanaka in order to not have to use a color filter system.

Conclusion

47. Any inquiry concerning this communication or earlier communications from the examiner should be directed to RAJ GUPTA whose telephone number is (571)270-5707. The examiner can normally be reached on Monday-Thursday 9am-6pm.

48. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tu T. Nguyen can be reached on (571)272-2424. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

49. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/RAJ GUPTA/
Examiner, Art Unit 4126
April 6, 2009

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